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The effect of *meta*-topolin (*m*T) and *meta*-topolin riboside (*m*TR) on the micropropagation of 'Williams' Cavendish banana was studied in comparison with benzyladenine (BA). *In vitro* cultures of Williams' banana, at third sub-culture level, were purchased from African Biotechnologies (Pty) Ltd South Africa. These were then sub-cultured on Murashige and Skoog media containing 15, 22.2 and 30 µM of BA, *m*T and *m*TR and supplemented with 2 mg/l indole-3-acetic acid (IAA), 3% sucrose, 0.2 g/l adenine sulphate, 0.38 g/l sodium dihydrogen orthophosphate and solidified with 2 g/l gelrite. Results recorded after six weeks of growth demonstrated that there were statistically significant differences in the number of shoots and roots between the treatments at 22.2 µM concentration. This concentration was previously reported to be optimum for banana micropropagation. At 15 µM there was excessive vegetative growth of individual plants with little or no multiplication. The 30 µM concentration on the other hand resulted in the growth of a mass of undifferentiated tissue. At 22.2 µM, *m*TR gave the highest multiplication rate (5.3 shoots per explant). BA-treated plants rooted better in the multiplication medium (contrary to our previous finding on *Aloe polyphylla*) and *m*TR-treated plants produced the least number of roots. *m*T treatment gave intermediate results in both shoot and root numbers. There was no significant difference in shoot length between the treatment means compared to the control. The effect of *m*T and *m*TR on somaclonal variation is being further investigated.

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Deep structure analysis: Finding scale-breaks in vegetation along the Shingwedzi River

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Many South African ecologists are trying to adopt an ecosystem approach to management and create policies that adhere to a complex systems paradigm. Within this paradigm, we view ecosystems as a nested hierarchy of scale domains, created through the emergent properties of interacting components at lower levels. Understanding the multi-scale structure inherent in complex systems and incorporating it into project design and monitoring schemes is problematic. To date a methodology to analyze scales of pattern expression in spatial data objectively is unheard of. We discuss the concept of Deep Structure in the landscape and present a linear scale space methodology aimed at understanding the scaled nature of tree distribution patterns as a response to ecological drivers. We present an early test of this methodology which will change the way we view scale issues in landscape ecology, allowing insight in to the ways in which ecosystem drivers affect the inner workings of a complex system.

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A molecular phylogeny reveals evidence of rapid and recent radiation in Cape and Australian members of the genus *Zygophyllum*

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The chloroplast *trn*L intron, *trn*LF spacer and *rbc*L sequences of a representative subset of *Zygophyllum* species occurring in the paleotropical arid areas of South-eastern and central Asia, North Africa, South-western Africa and Australia were determined and a phylogeny constructed with Bayesian statistics. The phylogeny was subsequently dated using penalized likelihood. The tree topology and branch lengths of the tree with the highest likelihood score from the Bayesian analysis was used for ancestral state area reconstruction using likelihood optimization in Mesquite version 1.2. Eight clades which are largely restricted to specific areas, and to which the basal node in that clade optimizes to a specific ancestral area, were identified. The number of species that radiated in a given area was counted, minus the species that had migrated out of the specified area. Radiation rates were calculated by relating species number in a given area to the age of the radiation. This revealed that the highest radiation rate in all of these areas was in the Cape and Australia. These findings and their implications will be presented.

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Perspectives on seed recalcitrance

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Stated most simply, recalcitrant seeds are sensitive to desiccation and are non-storable for one or more reason. The trait does not appear to have a taxonomic basis, and is predominant in tropical mesic habitats; however, seed recalcitrance does occur in a few temperate species, and in both habitat-types, provenance may have a marked effect on the degree of recalcitrance exhibited by a species. Among the underlying causes of recalcitrant behaviour in all cases, is that the seeds lack, or do not express, the various mechanisms entrained by desiccation-tolerant, orthodox seeds (and tolerant vegetative material); one of these is that there is no 'shut down' of metabolism as occurs in orthodox types, thus seed development grades into germination without any punctuating event. Current understanding of the major mechanisms conferring desiccation tolerance in seeds will be discussed, so that the implications of their absence/non-functionality in recalcitrant seeds can be appreciated. The presentation will also highlight complexities that complicate research on seed recalcitrance, as well as attempts to conserve the genetic resources of species producing such seeds. In the latter case, requirements to optimise short- to medium-term seed storage, cryostorage of excised embryonic axes, and the development of alternative explants for cryopreservation, are all aspects that will be enlarged upon.

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Red-listed: To be or not to be? A case study of *Stenostelma umbelluliferum*

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Schizoglossum umbelluliferum was described in 1895. The type specimen is thought to have been destroyed in World War II, resulting in the species remaining obscure. In 1999 it was taken into the synonymy of *Xysmalobium involucratum*, a species that is common and widely distributed. After its rediscovery in 2003, there was concern that the species was extremely rare and possibly threatened; it was also apparent that it belonged to the genus *Stenostelma*. The species was temporarily listed as Data Deficient, owing to lack of information on distribution and population status, as well as taxonomic uncertainty. As a precautionary measure, it was immediately added to Gauteng's Red List. Because of threat of development of the location of the only known populations in mid-2004, it was categorised as Critically Endangered. A survey was subsequently undertaken to establish a more precise distribution range of the taxon, resulting in more locations being recorded. This led to the downlisting of the Red List status of this species. Its conservation status has thus undergone a number of changes since its re-discovery: from Data Deficient to Critically Endangered, and then to Vulnerable and eventually to Near Threatened. The re-discovery of this plant and the various assessments of its conservation status